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BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
FALLS CHURCH, VA 22040-0747

EXAMINER
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CROW, ROBERT THOMAS

ART UNIT	PAPER NUMBER
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1634

NOTIFICATION DATE	DELIVERY MODE
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08/06/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/517,452	<b>Applicant(s)</b> ZOU ET AL.	
	<b>Examiner</b> Robert T. Crow	<b>Art Unit</b> 1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1, 19 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 19 and 21-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/04; 3/05</u> | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### *Election/Restrictions*

1. The Election of Species requirement filed 5 April 2007 is withdrawn.

### *Response to Amendment and Status of the Claims*

2. This action is in response to papers filed 22 May 2007 in which the claim 1 was amended, claims 2-18 and 20 were canceled, and new claims 21-25 were added. All of the amendments have been thoroughly reviewed and entered.

Claims 1, 19, and 21-25 are under prosecution.

### *Information Disclosure Statement*

3. The Information Disclosure Statement filed 9 December 2004 and 6 March 2005 are acknowledged. However, the webpage reference has been lined through because there is no publication date, and because no webpage is present on page 2 of the specification. In addition, no authors are listed, and no copy has been provided. See 37 CFR 1.98.

### *Claim Objections*

4. Claim 21 is objected to because of the following informalities: claim 21 recites "by adhesive; and d. said dieplate..." in lines 5-6 of the claim. The inclusion of "d." makes the following text appear to be one of the group of forces. It is suggested that the "d." be deleted from the claim.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claims 1, 19, and 21-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A. Claims 1, 19, and 21-25 are indefinite in claim 1, which recites each of the following:

I. The limitation "consisting primarily of" in line 1 of claim 1, because the specification does not clearly indicate what the basic and novel characteristic actually are. For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, "consisting primarily of" will be construed as equivalent to "comprising." See MPEP 2163.

II. The limitation "one or several dieplates and one or several substrates" in lines 1-2 of claim 1. The placement of the first and second "or" and the "and" makes it unclear what structures are required in the alternate embodiments. For example, the placement of the first "or" creates an embodiment of one dieplate and no substrates because the entire phrase "or several dieplates and one or several substrates" is rendered an alternative embodiment as a result of the placement of the first "or." It is suggested that "'one or several dieplates and one or several substrates" be amended to read "at least one dieplate and at least one substrate."

B. Claim 19 is indefinite in the recitation "with a relatively small average area" because it is unclear if it is the material which has the small average area. It is suggested that the claim be amended to clearly indicate which structural limitation of the claimed biochip must have the relatively small area.

C. Claim 21 is indefinite in each of the following:

I. The recitation "gravity" in line 3 of the claim. It is unclear how gravity is an irreversible connection, as required by line 1 of the claim, because a dieplate and substrate held together by gravity are reversibly connected.

II. The recitation "electric magnet" in line 4 of the claim. It is unclear how an electric magnet is an irreversible connection, as required by line 1 of the claim, because an electric magnet can be turned off, thereby making the connection reversible.

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III. The recitation "removable adhesion force" in line 5 of the claim. It is unclear how removable adhesion is an irreversible connection, as required by line 1 of the claim, because removable adhesion is inherently reversible.

D. Claims 21 and 23 are each indefinite in the recitation "said dieplate is partial or entire machine-eliminable" in line 6 of claim 21 and in lines 1-2 of claim 23. Because the specification does not teach a limiting definition of "machine-eliminable," the claim encompasses an embodiment wherein the dieplate is machine-removable from the substrate. Thus, it is unclear how the connection between the dieplate and the substrate is irreversible if the dieplate must be eliminable from the substrate.

E. Claim 24 is indefinite in the recitation "said dieplate is partial or entire removed mechanically" in the last 2 lines of the claim because it is unclear how the connection between the dieplate and the substrate is irreversible if the dieplate must be mechanically removed from the substrate.

*Claim Rejections - 35 USC § 102*

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 19, 21-22, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Kapur et al (PCT International Application Publication No. WO 00/60356, published 12 October 2000).

Regarding claim 1, Kapur et al teach a biochip. In a single exemplary embodiment, Kapur et al teach a cassette, which is a biochip having a substrate with a plurality of cell binding locations in the form of wells, which are reactors, wherein the number of reactors is maximized (page 36, Example 3). The substrate is mated with a multi-level chamber (page 36, Example 3). The chamber is the instantly claimed dieplate because the specific teaching of Kapur et al of "a" multi level-chamber is interpreted as a single

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unitary structure. Cells are attached (i.e., immobilized) to the cell binding locations within the well-type reactors (page 7, lines 10-20). The cells are probes in accordance with the preferred embodiment of a "probe" as described on page 1 of the instant specification.

Kapur et al further teach the wells are sealed to prevent flow of fluid across the sealing regions between the reactors (page 37, last 5 lines); thus, the reactors are closed flow reactors. The closed flow reactors also have an inlet and outlet because the dieplate also has a crossed array of microfluidic input channels and output channels connected to the well reactors (page 36, last 7 lines). Acrylic adhesives are used to connect the substrate and the chamber dieplate (page 37, line 28-page 38, line 12). The adhesive is an irreversible connection between the substrate and dieplate.

Regarding claim 19, Kapur et al teach the biochip of claim 1, wherein the substrate is any material which can form a reactor with a relatively small area, namely, Kapur et al teach the substrate is glass and has a small surface (i.e., area; page 20, lines 5-17). It is noted that Kapur et al also teach the substrate is "any other suitable material (page 20, lines 5-17), which anticipates the "any material" recited in line 2 of the instant claim.

Regarding claims 21-22, Kapur et al teach the biochip of claim 1, wherein the irreversible connection is performed with removable adhesion force produced by adhesion; namely, acrylic adhesives are used to connect the substrate and the chamber dieplate (page 37, line 28-page 38, line 12). The adhesive is an irreversible connection between the substrate and dieplate.

Regarding claim 25, Kapur et al teach the biochip of claim 1, wherein the dieplate presents an elastic material; namely, the chamber dieplate is made from an elastomer (page 30, lines 1-7).

9. Claims 1, 19, 21, and 23-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Stanchfield et al (U.S. Patent No. 6,054,100, published 25 April 2000).

Regarding claim 1, Stanchfield et al teach a biochip. In a single exemplary embodiment, Stanchfield et al teach the biochip of Figure 1, which comprises dieplates in the form of covers 14 and 16

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and a substrate in the form of synthesis block 12 (Abstract). The reactors have chemical linkers for solid phase organic synthesis bound to the polymer resins of the support (i.e., substrate; column 19, lines 19-30) wherein the organic synthesis is solid phase synthesis (column 3, lines 50-56) of biological compounds (column 1, lines 10-15). Thus, the substrate has probes immobilized thereon, wherein the biological compounds are probes in accordance with the preferred embodiment of a "probe" as described on page 1 of the instant specification. The dieplates 14 and 16 are connected to substrate 12 to seal the tops and bottoms of the wells of substrate 12, thereby creating sealed wells (column 4, lines 5-10), which are closed flow reactors. The reactors have inlet and outlet portions (column 4 lines 40-45). The dieplates and substrate are irreversibly connected by clips 68 (column 10, lines 25-40), which generate mechanical force by fixture, namely, closing the clip to fix the covers together. The connection is irreversible because the connection is maintained by the clips indefinitely. Figures 1 and 4 further show the number of reactors is maximized because reactors 24 constitute the majority of the structure of the substrate.

Regarding claim 19, Stanchfield et al teach the biochip of claim 1, wherein the substrate is made of glass (column 9, lines 40-55).

Regarding claim 21, Stanchfield et al teach the biochip of claim 1, wherein the irreversible connection uses clips 68 (column 10, lines 25-40), which generate mechanical force by fixture, namely, closing the clip to fix the covers together. The connection is irreversible because the connection is maintained by the clips indefinitely.

Regarding claim 23, Stanchfield et al teach the biochip of claim 1, wherein said dieplate is entire machine-elimable, when it is desire to open said reactor formed by said irreversible connection; namely, the dieplates are connected to the substrate by clips 68 (Figure 1), which can be removed to open the reactors by a robotic arm. The irreversible connected formed by the clips is thus machine eliminable.

Regarding claim 24, Stanchfield et al teach the biochip of claim 1, wherein said biochip is a variable biochip which may be transformed from closed state to open state; namely, the dieplates are

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connected to the substrate by clips 68 (Figure 1), which can be removed to open the reactors by a robotic arm, and are thus mechanically removed to open the substrate.

Regarding claim 25, Stanchfield et al teach the biochip of claim 1, wherein said dieplate presents an elastic material; namely, the dieplates hold (i.e., present) the substrate for use (Figure 1), wherein the substrate is polypropylene (column 9, lines 40-55), which is an elastic material. Thus, the dieplates present the elastic substrate material by holding it in place.

*Claim Rejections - 35 USC § 103*

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1, 21, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kapur et al (PCT International Application Publication No. WO 00/60356, published 12 October 2000) in view of Stanchfield et al (U.S. Patent No. 6,054,100, published 25 April 2000).



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It is noted that while claim 21 has been broadly rejected under 35 USC 102(b) as described above in Section 7, the claim is also obvious using the more narrow interpretation outlined below.

Regarding claims 21 and 23-24, Kapur et al teach a biochip. In a single exemplary embodiment, Kapur et al teach a cassette, which is a biochip having a substrate with a plurality of cell binding locations in the form of wells, which are reactors, wherein the number of reactors is maximized (page 36, Example 3). The substrate is mated with a multi-level chamber (page 36, Example 3). The chamber is the instantly claimed dieplate because the specific teaching of Kapur et al of "a" multi level-chamber is interpreted as a single unitary structure. Cells are attached (i.e., immobilized) to the cell binding locations within the well-type reactors (page 7, lines 10-20). The cells are probes in accordance with the preferred embodiment of a "probe" as described on page 1 of the instant specification.

Kapur et al further teach the wells are sealed to prevent flow of fluid across the sealing regions between the reactors (page 37, last 5 lines); thus, the reactors are closed flow reactors. The closed flow reactors also have an inlet and outlet because the dieplate also has a crossed array of microfluidic input channels and output channels connected to the well reactors (page 36, last 7 lines).

While Kapur et al teach acrylic adhesives are used to irreversibly connect the substrate and the chamber dieplate (page 37, line 28-page 38, line 12), Kapur et al do not teach an irreversible connection in the form of mechanical force generated by fixture (i.e., claim 1).

However, Stanchfield et al teach a biochip comprising dieplates in the form of covers 14 and 16 and a substrate in the form of synthesis block 12 (Abstract). The dieplates and substrate are irreversibly connected using clips 68 (column 10, lines 25-40), which generate mechanical force by fixture, namely, closing the clip to fix the covers together. The connection is irreversible because the connection is maintained by the clips indefinitely (i.e., claim 21). The resulting irreversible connection further results in a dieplate that is entire machine-eliminable, when it is desired to open said reactor formed by said irreversible connection because clips can be removed to open the reactors by a robotic arm. The irreversible connection formed by the clips is thus machine eliminable (i.e., claim 23). Further, as a result

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of using the clips, said biochip is a variable biochip which may be transformed from closed state to open state because clips 68 can be removed to open the reactors by a robotic arm, and are thus mechanically removed to open the substrate (i.e., claim 24). Stanchfield et al further teach the clips have the added advantage of ensuring the proper alignment of the substrate to the dieplates (column 10, lines 25-40).

It would therefore have been obvious to a person of ordinary skill in the art at the time the claimed invention was made to have modified the biochip as taught by Kapur et al with the irreversible connection of Stanchfield et al with a reasonable expectation of success. The modification would result in an irreversible connection in the form of mechanical force generated by fixture (i.e., claim 1), thereby producing an entire machine eliminable dieplate (i.e., claim 23), wherein the biochip is a variable biochip (i.e., claim 24). The ordinary artisan would have been motivated to make the modification because said modification would have resulted in a biochip having the added advantage of having a connection that ensures the proper alignment of the substrate to the dieplates as explicitly taught by Stanchfield et al (column 10, lines 25-40).

13. Claims 1 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stanchfield et al (U.S. Patent No. 6,054,100, published 25 April 2000) in view of Kapur et al (PCT International Application Publication No. WO 00/60356, published 12 October 2000).

Regarding claim 22, Stanchfield et al teach a biochip. In a single exemplary embodiment, Stanchfield et al teach the biochip of Figure 1, which comprises dieplates in the form of covers 14 and 16 and a substrate in the form of synthesis block 12 (Abstract). The reactors have chemical linkers for solid phase organic synthesis bound to the polymer resins of the support (i.e., substrate; column 19, lines 19-30) wherein the organic synthesis is solid phase synthesis (column 3, lines 50-56) of biological compounds (column 1, lines 10-15). Thus, the substrate has probes immobilized thereon, wherein the biological compounds are probes in accordance with the preferred embodiment of a "probe" as described on page 1 of the instant specification. The dieplates 14 and 16 are connected to substrate 12 to seal the tops and

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bottoms of the wells of substrate 12, thereby creating sealed wells (column 4, lines 5-10), which are closed flow reactors. The reactors have inlet and outlet portions (column 4 lines 40-45). Figures 1 and 4 further show the number of reactors is maximized because reactors 24 constitute the majority of the structure of the substrate.

While Stanchfield et al also teach the dieplates and substrate are irreversibly connected by clips 68 (column 10, lines 25-40), which generate mechanical force by fixture, Stanchfield et al do not teach the irreversible connection is performed with an adhesive.

However, , Kapur et al teach a biochip having a substrate with a plurality of cell binding locations in the form of wells, which are reactors, wherein the number of reactors is maximized (page 36, Example 3). The substrate is mated with a multi-level chamber (page 36, Example 3). Kapur et al also teach the biochip of claim 1, wherein the irreversible connection is performed with removable adhesion force produced by adhesion; namely, acrylic adhesives are used to connect the substrate and the chamber dieplate (page 37, line 28-page 38, line 12). The adhesive is an irreversible connection between the substrate and dieplate, which has the added advantage of preventing flow between the closed reactors (page 37, line 28-page 38, line 12), thereby preventing cross-contamination between the reactors.

It would therefore have been obvious to a person of ordinary skill in the art at the time the claimed invention was made to have modified the biochip as taught by Stanchfield et al with the irreversible connection using adhesives as taught by Kapur et al with a reasonable expectation of success. The ordinary artisan would have been motivated to make the modification because said modification would have resulted in a biochip having the added advantage of having a connection prevents cross-contamination between the reactors as a result of preventing flow between the closed reactors as explicitly taught by Kapur et al (page 37, line 28-page 38, line 12).

#### *Conclusion*


15. No claim is allowed.

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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert T. Crow whose telephone number is (571) 272-1113. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
**JEHANNE SITTON**  
**PRIMARY EXAMINER**  
7/31/07

Robert T. Crow  
Examiner  
Art Unit 1634

